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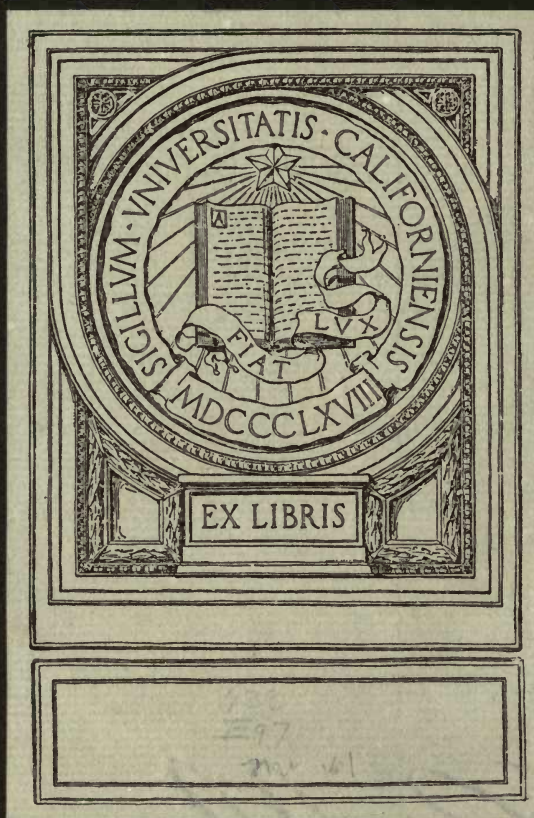
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THE  
Mineralogy of Pennsylvania.

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PART I.



THE  
MINERALOGY OF PENNSYLVANIA.



THE  
Mineralogy of Pennsylvania,

BY

JOHN EYERMAN.

PART I.

*To be used as a Supplement in connection with Dr. F. A. Genth's*  
*"Preliminary Report on the Mineralogy of Pennsylvania,"*  
(1875.)

UNIVERSITY OF  
CALIFORNIA

EASTON, PA.:

1889.

## LIST OF JOURNALS QUOTED IN THIS WORK.

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Proceedings of the Academy of Natural Sciences.

Proceedings of the Mineralogical and Geological Section of the Academy of Natural Sciences.

Proceedings of the American Philosophical Society.

American Chemical Journal.

American Journal of Science.

Reports of the Second Geological Survey of Pennsylvania.

# MINERALOGY OF PENNSYLVANIA.

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## PART I.

### 1. SILVER. (4)<sup>1</sup>

According to Dr. D. B. Brunner, traces of silver occur in Berks county, at North Reading, in Oley township, and on Cushion Mt.

### 2. COPPER. (4)

Native copper is found on Bingham's farm, three miles north-east of Monterey Springs, Adams county.

### 3. SULPHUR. (7)

Some good sized masses of sulphur were found by me, several years ago, at the Ueberroth zine mine, Friedensville, Lehigh Co., probably resulting from the desulphuration of the sphalerite.

### 4. GRAPHITE. (8)

Graphite occurs, with gneiss and quartz on A. Johnson's farm S. E. from Feasterville, Bucks Co., also on the farms of Messrs. Fegely, Beehtel and Himmelreich in the vicinity of Boyertown, at Dr. Funk's fish-pond, on Schneck's farm, in Longswamp twp., at Siesholtzville, at Antietam Lake, and in yellow jasper at the Kinzi mine, Stony creek, all in Berks Co. I have occasionally met with graphite, coating the granite at "Marble Hill," opposite Easton and one mile north of Phillipsburg, N. J.

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<sup>1</sup> Refers to page in Dr. Genth's Report.

## 5. GALENITE. (10)

Galenite occurs in many localities throughout the State. At one mile N. E. of McConnellstown, Huntingdon Co., it is found near the contact of the *Lewistown limestone* with the underlying *Onondaga shales*. According to Dr. Brunner, it is occasionally found at Fritz Island, Berks Co., and associated with sphalerite, it occurs at Victor Hollow, Georges twp., Fayette Co.

At the Millview limestone quarry near Forksville, Sullivan Co., in small pieces in the upper layer of the limestone. At Doughty mine, a few miles south of Sunbury, in Northumberland Co., it is found in considerable quantity, associated with sphalerite. This mine was unsuccessfully operated, a few years ago, by the Susquehanna Mining and Smelting Co.

At a mine near Espy, Columbia Co., small quantities of galenite and sphalerite were formerly mined, and small quantities have been found near Frystown, York Co.

## 6. BORNITE. (12)

Small quantities of bornite have been found at Fritz Island mine and at Jones' mine, Berks Co.

## 7. SPHALERITE. (14.)

It is occasionally found on Turn's farm, Middle Smithfield twp., Monroe Co.

It was formerly mined at the New Britain mine, Bucks Co., at the Doughty mine near Sunbury, at Victor Hollow, Fayette Co., and at the Keystone mines in Sinking Valley, Blair Co., at Herr's Zinc Mine, three miles north from Lancaster.

In the Museum of Lafayette College there is a specimen of sphalerite with siderite, from Scranton.

## 8. CHALCOCITE. (16)

Some years ago, I observed a single specimen of chalcocite in quartz at the Ecton Whim shaft, near Shannonville, Montgomery Co.

According to P. Frazer, Jr., chalcocite (in ore) occurs at the Big Hill, Cornwall. Also sparingly at Fritz's Island and at Jones' Mine, Berks Co.

#### 9. MILLERITE. (16)

Millerite, in capillary crystals, is found in cavities of dolomite at the soapstone quarry, at Lafayette, Montgomery Co. (T. D. Rand.)

#### 10. PYRRHOTITE. (17)

Occurs at Boyertown, Raudenbush mine and Ohlinger dam, and a nickeliferous variety at Fritztown, Berks Co.

#### 11. PYRITE. (19)

I have seen some remarkably fine stalactical masses of pyrite, from a limonite mine near Shimersville, Lehigh Co.

It occurs with gneiss at Paxon's farm, near Feasterville, Bucks Co.

At Breinig's limonite mine, near Breinigsville, Lehigh Co.

At Cornog's farm, near Cedar Hollow station, Tredyffrin twp., Chester Co., imbedded in "bastard" marble.

At Whiteland station, Chester Co., with "bastard" marble.

I have noticed considerable quantities of pyrite at the Wheatfield magnetite mine, near Fritztown, Berks Co.

In Blair Co. pyrite occurs associated with sphalerite and galena at the Keystone zinc mines, near Birmingham.

In York Co. pyrite coated with limonite, two miles from York city.

Dr. Valentine, of Lebanon, has observed radiating pyrite S. of the Cornwall banks, Lebanon Co.

Fine octahedral crystals occur at Boyertown and at Fritz's Island, Berks Co. and globular radiating specimens are found in Centre and Windsor townships. (Berks Co.)

"Cubic crystals, from  $\frac{1}{8}$  to 2 inches in diameter, occur loose in the soil near "Fetter's Mill," East Whiteland twp."

The finest, best developed and largest crystals of pyrite are found at the French Creek mines, at St. Peter's, Warwick twp., Chester Co.

For a detailed crystallographic description of pyrite from this locality the reader is referred to Mr. Penfield's admirable article "*On some curiously developed pyrite crystals from French Creek, Delaware (Chester J. E.) Co., Pa.*" (Am. J. Sci., Vol. 37, March 1889,) and for a general account of the occurrences, to my paper "*On the Mineralogy of the French Creek Mines,*" (N. Y. Acad. Sci., Jan. 14th, 1889.)

## 12. CHALCOPYRITE. (21)

Associated with azurite and malachite, chalcopryrite was observed by me, some years ago, at the so-called "Copper Mine" a few miles from Sellersville, Montgomery Co. Also at Boyertown, Berks Co., and at the French Creek Mines, St. Peter's, Chester Co.\*

## 13. MARCASITE. (22)

According to Dr. Brunner, of Reading, this mineral is found in Berks Co., at Eppler's quarry, at Leesport and at Fritz Island.

## 14. FLUORITE. (29)

Fluorite occurs at the Kleckner limestone quarries near Balliettsville, Lehigh Co. Colors: green, purple and pink. Imper-

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\*Mineralogy of French Creek Mines.

fect octahedral forms were observed. Analyses of purple and green varieties by Dr. E. F. Smith<sup>1</sup> resulted :

Purple Variety.

Fl.....	49.20
Ca....	50.87
Fe <sub>2</sub> O <sub>3</sub> .....	trace
	<hr/>
	100.07

Green variety.

Fl.....	49.00
Ca.....	50.91
Fe <sub>2</sub> O <sub>3</sub> . ....	trace
	<hr/>
	99.91

Sp. gr. 3.17-3.24.

Purple fluorite, in perfect octahedra, occurs S. of Emaus, Lehigh Co.

Forming thin films on the limestone it occurs in the Ironton R. R. Co.'s quarry at Ironton, Lehigh Co.

And massive, of a deep purple color, in the limestone near the village of Howellville, in Tredyffrin twp., Chester Co.

In cubes of a deep blue color, in the limestone at Leinbach's Hill and at the "Big Dam" S. of Reading; at Brook's quarry, N. of Reading; in DeTurk's quarry, Exeter twp.; at the Wheatfield mine in amber colored crystals; at the Fritz Island mine, and as pale, topaz-colored modified cubes, associated with calcite, at Fritztown, Berks Co. These latter measuring  $\frac{1}{8}$  to  $\frac{7}{8}$  of an inch in diameter.

## 15. CUPRITE. (30)

Cuprite occurs sparingly at the Jones Mine and at Boyertown, Berks Co. I have been unable to obtain specimens from either place.

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<sup>1</sup> Am. Chem. Jour., V, 272.

Bright vermilion, earthy incrustations occur at the gneiss quarries at Frankford, Philadelphia.

#### 16. MELACONITE. (31)

Five or six years ago, I obtained a specimen of melaconite, associated with malachite, from Franklinton, Adams Co.

Also occurs sparingly at Jones' Mine, Berks Co.

#### 17. CORUNDUM. (31)

An attempt was made several years ago, at Shimersville, Lehigh Co., to mine corundum. The result, however, was not a financial success, although a considerable quantity of the mineral was taken out. I was able to obtain a quantity of fairly well developed prisms, some of which measured 8<sup>cm</sup> by 3<sup>cm</sup>.

An analysis by Dr. E. F. Smith<sup>1</sup> resulted :

SiO <sub>2</sub> .....	3.28
H <sub>2</sub> O.....	1.37
Al <sub>2</sub> O <sub>3</sub> .....	85.75
Fe <sub>2</sub> O <sub>3</sub> .....	4.26
TiO <sub>2</sub> .....	2.74
MgO.....	trace
CaO.....	1.99
	<hr/>
	99.39

Sp. gr. 3.898.

#### 18. MENACCANITE. (35)

Occurs massive at George Hammit's quarries, one mile East of Edge Hill furnace, Montgomery Co.

In small crystals and granular at the corundum mine near Shimersville, Lehigh Co.

<sup>1</sup> Am. Chem. Jour., V, 275.

Near Adamstown, Lancaster Co., it is found in large crystals in quartz.

An analysis by Knerr and Brunner<sup>1</sup> resulted:

SiO <sub>2</sub> .....	0.50
TiO <sub>2</sub> .....	13.31
Fe <sub>2</sub> O <sub>3</sub> .....	53.36
FeO.....	32.38
	<hr/>
	99.55

Sp. gr. 4.6.

Near Texas, Lancaster Co., it occurs massive and has been mined as an ore of iron.

Abundant at the Girard Avenue Bridge tunnel, Fairmount Park, Philadelphia. One crystal found by Mr. G. H. Parker is "quite lustrous in appearance and measures  $\frac{1}{3}$  of an inch in thickness by one inch in width. Its general form is that of an almost perfect half-circle, the whole being partly imbedded edge-wise in a matrix of quartz."

## 19. CHROMITE. (39)

I am indebted to E. Mortimer Bye, Esq., of Wilmington, Del., for the following complete statistics of the chrome production:

Lancaster Co.		TONS.
1. Wood's Mine, <sup>2</sup> depth 800.....		200,000
2. Line Pit	} .....	25,000
3. Jenkins' Mine		
4. Carter's mine.....		600
5. Rock Spring Mine, (B 41).....		1,000
6. Little Horse Shoe Mine.....		30
Chester Co.		
7. Scott's Mine, (W. Nottingham).....		6,000
8. Smaller Mines, including "White Barrens,".....		500
Delaware Co.		
9. Several small pockets.....	..about	200

<sup>1</sup> Am. Chem. Jour., VI, 413

<sup>2</sup> This mine is said to have netted its owners at least \$5,000,000.

## Sand or Stream Chrome.

10. E. and W. Nottingham, Chester Co.	}	.....	10,00
11. And Little Britain twp., Lancaster Co.			
12. Middletown twp., Delaware Co.....			

The total production, therefore, has probably been about 245,000 tons.

Wood's Mine was opened in 1834 and worked to a depth of 800 feet, when it exhausted, and in 1881 was stripped and abandoned. Since then the other mines have been abandoned, and the United States now receives the majority of its chrome ore from the Urals in Russia and from Turkey in Asia.

Chromite also occurs on the Williamson property, Delaware Co.

At Radnor and in Upper Providence, Marple and Newtown twps., Delaware Co.

In octahedral crystals at Taylor's quarry, one mile N. of West Chester.

## 20. RUTILE. (44)

Rutile in quartz occurs near Embreville, Newlin township, Chester Co.

## 21. PYROLUSITE. (45)

Associated with limonite, this mineral is found at Ray's hill, near Robinsonville, Monroe twp., Bedford Co.

At Dry Hollow, Huntingdon Co., associated with wad and psilomelane.

On the farm of Jacob Stine, in Upper Milford twp., Lehigh Co., two miles S. of Macungie, it occurs mixed with limonite, and at the village of Mountainville, S. of Allentown, it is found

in fine crystals coating the interior of the limonite nodules.  
An analysis by Dr. E. F. Smith<sup>1</sup> gave

SiO <sub>2</sub> .....	9.93
Fe <sub>2</sub> O <sub>3</sub> .....	4.21
Al <sub>2</sub> O <sub>3</sub> .....	trace
MnO <sub>2</sub> .....	82.66
Mn <sub>3</sub> O <sub>4</sub> .....	3.13
	<hr/>
	99.93

22. TURGITE. (46)

23. GOTHITE. (48)

It is unnecessary to give any localities under these two species, both of which are generally associated with limonite, and as such they may be found at the several hundred mine openings throughout the counties of Northampton, Lehigh and Berks, and at the various other limonite mines scattered over the State.

#### 24. XANTHOSIDERITE.

This hydrous iron oxide is found at four localities in Berks Co., at Flint Hill, Pricetown, Lyons and Fleetwood.

#### 25. BRUCITE. (51)

This mineral is found botryoidal and laminar, at Fritz's Island, at Ruth's mine, and two miles S. of Sinking Spring, Spring twp., Berks Co.

Analysis of the brucite from Fritz Island (a) and Sinking Spring, (b) by Drs. Schoenfeld and Smith<sup>2</sup> gave

	a.	b.
MgO.....	66.78.....	66.19
Fe <sub>2</sub> O <sub>3</sub> .....	0.44.....	1.68
CaO .....		1.24
H <sub>2</sub> O .....	32.52.....	31.05
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	99.74	100.16

<sup>1</sup> Am. Chem. Jour., V, 277.

<sup>2</sup> *Ibid* V, 281.

## 26. PSILOMELANE. (53)

I have obtained some beautiful stalactitic specimens from the Bennett mine, one mile S. of South Easton. Large botryoidal masses of a cobaltiferous variety occur at Wharton's mine, three miles from Hellertown, Northampton Co.

Considerable quantities have been occasionally met with at the Ironton Co.—Balliet mine, at Ironton, Lehigh Co.

An analysis by Mr. H. Pemberton, Jr.,<sup>1</sup> resulted

Manganese binoxide.....	84.88
Manganous oxide .....	3.77
Oxide of cobalt.....	1.68
Oxide of nickel.....	trace
Baryta.....	trace
Lime.....	1.90
Magnesia.....	0.79
Soda.....	0.19
Potash.....	3.50
Water.....	4.38
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	101.09

Occurs also at the Dry Hollow mine, Huntingdon Co., associated with wad and pyrolusite.

In Berks Co. good specimens have been obtained at the Rockland Forge.

## 27. WAD. (53)

I have observed some beautiful specimens of dendritic wad, coating the limonite, at the Ackerman mine, S. from Glendon, Northampton Co.

Several tons of wad were mined, some years ago, at Great Bend, Susquehanna Co.

It is found in small quantities in Westfall township, Pike Co., and in Bethel and Darby townships, Delaware Co.

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<sup>1</sup> Second Geological Survey, Vol. DD, 42.

Reniform wad, coating *Pottsville conglomerate* at Wray's Hill tunnel, Huntington Co. and at Dry Hollow mine.

It is also quite abundant at many localities in Venango, Co.

The following are the localities in Berks Co.:

Globular, near Birdsboro; massive, in the old Oley tunnel mine; at Lyons, Althouse farm, Maiden Creek; in mammillary concretions near the Morgantown road,  $\frac{1}{4}$  mile below Lancaster bridge.

I have obtained a specimen of dendritic wad from Cornwall, Lebanon Co.

It is also found at Hitner's marble quarries, in Plymouth twp., Montgomery Co., and contains a small percentage of cobalt.

The variety *Asbolite* occurs at Flourtown, Montgomery Co., where it forms an incrustation upon psilomelane.

## 28. QUARTZ. (55)

*Sec. I. Crystalline.*—Five or six years ago I obtained a very clear hexagonal crystal, with good faces and termination, at the Court House grounds, Easton, Pa. The length is about  $6\frac{1}{2}$  cm. Many smaller crystals were also found, some of them perfectly clear. Another good locality in Easton is at the vacant lot at Northampton and Twelfth streets. I have also observed fine crystals in groups, at Flint Hill, near Leithsville, Northampton Co.

Transparent crystals occur on Lee's farm, S. E. of Friedensburg, and in Windsor, Greenwich townships, Berks Co. Doubly terminated crystals occur at Noll's mine, Fleetwood, Berks Co. In the same county small crystals are found at Fritz Island, and at the Crystal Cave, Virginsville. Also near Buffalo Run, Patton twp., Centre Co.

Drusy quartz, in clusters, occurs at the Barren ridge, near West Chester, at Birmingham quarries, and at Strode's mill, S. of West Chester.

*Sec. II. Amethystine.*—Crystals of a deep purple color occur scattered through the soil from one to one and a half miles S. of West Chester. In Pennsbury occur brilliant crystals; on

the farm of W. Painter the crystals are penetrated by needles of rutile. Crystals of a good color have been found near Embreeville, Chester Co.

*Sec. III. Smoky.*—A short time ago I received a remarkably clear and well developed crystal 10 cm. in length, said to have been found in the vicinity of Hellertown, Northampton County. Crystals also occur in Bethel and Upper Darby townships and near Glen Riddle, Delaware Co., in Sadsbury, Chester Co., on Updegrove's farm in Union, on Berg's farm in Albany, in Windsor twp., and on Flint Hill, Berks Co.

*Sec. IV. Blue.*—Blue quartz is found in large masses of a deep color, two miles N. of Lionville, Chester Co.; also at Radnor, Delaware Co.

*Sec. V. Milky.*—This variety is found in Bethel township, Delaware Co., and at Cornwall, Lebanon Co.

*Sec. VI. Chalcedony.*—Good specimens are found at Texas, Lancaster Co., at Fleetwood, Friedensburg, Mertztown and Fritz Island in Berks Co., and near Edgmont, Delaware Co.; at Cornwall, Lebanon Co., in mammillary and botryoidal forms, of a pale brown or greenish color.

*Sec. VII. Agate.*—In Berks Co. agate occurs at Wernersville, Bomegratz's, Gottschall's, Flint Hill and Mertztown.

*Sec. VIII. Agate-jasper.*—At all the localities given under Sec. VII.

*Sec. IX. Hornstone.*—This variety is found at Friedensburg, Berks Co.

*Sec. X. Jasper.*—Occurs at all the localities given under Sec. VII, at Cornwall, Lebanon Co., on the "Barren Ridge," N. from West Chester, and at "Rock Springs," near Texas, Lancaster Co.

## 29. OPAL. (61)

The variety *hyalite* occurs on gneiss near the West Chester turnpike, Willistown township, Chester Co., and of a beautiful light green color, perfectly transparent, on gneiss, at a quarry on Mill street, Germantown.

## 30. ENSTATITE. (62)

There is a specimen of enstatite in the museum of Lafayette College, from Newportville, Bucks Co. Also one from Spring Mill, Montgomery Co.

Enstatite from Rose's quarry, opposite Lafayette, Montgomery Co. has been analyzed by Mr. H. Trimble<sup>1</sup> who found :

	I.	II.
Silicic acid .....	53.41	53.32
Alumina .....	2.12	2.13
Ferric oxide.....	4.66	4.72
Ferrous oxide .....	5.71	5.71
Manganous oxide.....	0.87	0.38
Magnesia .....	32.47	33.72
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	99.24	99.98

Also found in West Nottingham twp., Chester Co.

## 31. PYROXENE. (64)

According to Dr. Brunner, the largest crystals found in Berks Co. occur at Gottschall's farm, in Alsace twp.

It is abundant in the vicinity of Antietam Lake and at Rauch's mine, in Hereford twp.; also at Ohlinger's Dam; at Eschbachville, Sparr's mine; Boyertown; Raudenbush mine, Berks Co., and two miles from Hosensack station, Lower Milford twp., Lehigh Co.

*Variety a. Sahlite.*—An analysis of this variety from Seisholtzville, Berks Co.,<sup>1</sup> resulted :

Silica.....	49.30
Ferric oxide.....	0.53
Alumina.....	14.98
Ferrous oxide.....	6.02
Magnesia.....	8.27
Lime.....	21.45
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	100.55

<sup>1</sup> Geol. of Penn., C 6 129.

<sup>1</sup> Sydney Castle Geol. of Penn., D p. 6.

It is also found massive and crystallized at the French Creek Mines, St. Peter's, Chester Co. Some of these crystals attain a length of 42<sup>mm</sup>.

*b. Mussite.*—This occurs in East Bradford twp, Chester Co.

*c. Augite.*—In Berks Co. at Babb's tavern and at Ohlinger mill, six miles E. of Reading.

*d. Pyrrallolite.*—At the French Creek mines, St. Peter's, Chester Co., massive and occasionally radiating of a light pink color.

### 32. ANTHOPHYLLITE.

Dr. Genth describes this under amphibole (actinolite,) but I prefer, however, to treat it as a distinct species. It occurs in beautiful radiations of a yellowish brown color, two miles N. of Media, Delaware Co., and at Texas, Lancaster Co.

### 33. AMPHIBOLE. (66)

*a. Actinolite.*—Last fall, (Oct. 1888) I discovered some fine crystals of actinolite associated with tremolite, a few rods N. W. of the Electric R. R. car house, College Hill, Easton. Massive and crystallized it is found at the following localities in the vicinity of Easton: Herster's dam 1½ miles W. of the city; at several tale openings along the Bushkill creek; along the Delaware River and at several places along the Chestnut Ridge N. from the city. Near the Black Horse tavern, Delaware Co., it occurs glassy, of a deep green color, in round crystalline masses and also in broad blades of a light green color, and at the Birmingham quarries S. of West Chester.

*b. Byssolite.*—According to Mr. Matters, the superintendent, I have now in my possession the finest specimen of byssolite taken from the French Creek mines, St. Peter's, Chester Co. This specimen contains hundreds of perfect needle-like crystals, many of which are 42<sup>mm</sup> in length.

It also occurs here, disseminated throughout the calcite, and for which I have proposed the name "*Byssolitic calcite.*" In

Berks Co. it is found at Jones' mine (C. M. Wheatley), at Ohlinger dam, Antietam Lake, Boyertown and in Longswamp twp.

*c. Tremolite.*—Associated with actinolite it is found at all the Easton localities given above.

*d. Asbestos.*—In short fibre, it occurs at Harman's blacksmith shop, Warrington twp., York Co.; in feldspar on M'Elwee's farm four miles S. E. of Dillsburg, and on M. Elicker's farm five miles E. of Dillsburg, York Co.

At Cornwall, Lebanon Co., it is found between the Middle and Grassy Hills.

*d. I. Mountain Leather.*—There is a specimen of this sub-variety in the Lafayette College museum from Bowertown, Berks Co.

*d. II. Mountain Cork.*—Occurs  $\frac{1}{3}$  of a mile N. W. of Radnor station, Delaware Co. (Rand.)

### 34. BERYL. (70)

This mineral is found in Ridley and Springfield townships, Delaware Co. Dr. Genth mentions a crystal from Chester Co. weighing 51 lbs. Mr. Jefferis informs me that it was found at "Beryl Hill," seven miles W. of West Chester.

### 35. CHRYSOLITE. (71)

Associated with picrolite it is found two miles E. of Wakefield, Lancaster Co. In Delaware Co. in the townships of Edgemont and Middleton. I have noticed this mineral also at Cornwall, Lebanon Co., where it occurs in small crystals of a brownish color, associated with magnetite. In Berks Co. it is found at the Wheatfield mine, near Fritztown, and at the Fritz Island mine.

### 36. FAYALITE.

This mineral is found  $1\frac{1}{2}$  miles N. E. of Boyertown, Berks Co. and as a furnace product, at the Reading sheet mill.

## 37. GARNET. (72)

The following localities have been reported to me as "Localities for garnets." In no case has the variety been given, and I am therefore, obliged to place them under this general heading. Near Oakford, Bucks Co., at Mathuly mill, near Jenkintown; in Berks Co., on V. Hartman's farm, Alsace twp.; at Bishop's mill, Exeter twp.; in Ruscombmanor twp., near Pricetown; at Gottschall's mines and at Antietam Lake.

*Var. a. Grossularite.*—This variety occurs at Leiperville, Delaware Co.

*b. Almandite.*—Imperfect crystals are found at Mohr's mine, near Shimersville, Upper Milford twp., Lehigh Co. An analysis by Dr. Smith<sup>1</sup> gave:

SiO <sub>2</sub> .....	35.92
Al <sup>2</sup> O <sub>3</sub> .....	19.18
Fe <sub>2</sub> O <sub>3</sub> .....	4.92
FeO.....	29.47
MnO.....	4.80
CaO...	2.38
MgO.....	3.70
	-----
	100.37

Sp. gr. 4.03.

An analysis<sup>2</sup> of the variety from Chelsea, Bethel twp., Delaware Co., resulted:

SiO <sub>2</sub> .....	41.11
Al <sub>2</sub> O <sub>3</sub> .....	21.60
Fe <sub>2</sub> O <sub>3</sub> .....	2.11
FeO.....	25.86
MnO.....	2.22
MgO.....	5.41
CaO.....	1.89
	-----
	100.20

Sp. gr. 4.028.

<sup>1</sup> Am. Chem. Jour., V, 276.

<sup>2</sup> F. A. Genth, Jr., C 5, 113.

Dr. Genth<sup>1</sup> has analyzed the variety from Darby, Delaware Co., with the following results :

SiO <sub>2</sub> .....	35.97
TiO <sub>2</sub> .....	5.12
Al <sub>2</sub> O <sub>3</sub> .....	18.72
Fe <sub>2</sub> O <sub>3</sub> .....	1.39
FeO.....	30.42
MnO .....	0.42
MgO .....	5.08
CaO.....	2.79
<hr/>	
	99.91

Sp. gr. 4.186.

This variety may be identical with the "Titaniferous Garnet" described and analyzed by Mr. H. A. Keller<sup>2</sup>. His analysis resulted as follows :

SiO <sub>2</sub> ....	36.92
TiO <sub>2</sub> .....	1.14
FeO .....	27.36
Fe <sub>2</sub> O <sub>3</sub> .....	3.74
Al <sub>2</sub> O <sub>3</sub> .....	26.54
MnO .....	0.33
CaO.....	2.76
MgO.....	1.66
<hr/>	
	100.45

Sp. gr. 4.25.

*c. Andradite*.—Among a number of minerals sent to me for examination by Dr. S. G. Valentine, of Lebanon, I have discovered this variety of garnet. It occurs in quartzose rock at Cornwall, Lebanon Co.; color brownish red. It is also found at Spies Church, Alsace-twp., Berks Co., and near Hosensack sta-

<sup>1</sup> Geol. of Penna., C 5, 114.

<sup>2</sup> Proc. M. & G. Soc., Acad. Natl. Sci., 1880, 21.

tion, Lower Milford twp., Lehigh Co., an analysis of which by Dr. Smith<sup>1</sup> gave:

SiO <sub>2</sub> .....	35.25
Fe <sub>2</sub> O <sub>3</sub> .....	32.17
FeO.....	0.92
CaO.....	30.80
MgO.....	trace
	<hr/>
	99.14

Color: yellow. Sp. gr. 5.13.

### 38. ZIRCON. (75)

Small crystals have been found on Jacob Stine's farm in Upper Milford, two miles S. of Macungie, Lehigh Co.

### 39. VESUVIANITE. (77)

This mineral in well developed, terminated prisms of a yellow color, occurs sparingly at the Fritz Island mine, Berks Co.

### 40. EPIDOTE. (78)

Associated with molybdenite it is found at Frankford, Philadelphia. Also massive in Berks Co. at the following localities: Fleetwood, Boyertown, Pricetown and Hancock, and in crystals at Antietam Lake and in Longswamp twp.

### 41. ALLANITE. (79)

Associated with zircon (in quartz) it is found at Yellow Springs, Chester Co.

### 42. ZOISITE. (80)

This mineral is found at the Poor-house quarries, Chester Co., and at Leiperville, Delaware Co.

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<sup>1</sup> E. F. Smith, Am. Chem. Jour., V, 277.

43. AXINITE.<sup>1</sup>

The discovery of this rare mineral in this State is due to Prof. F. Prime, Jr., who brought it to the notice of the late Prof. W. T. Roepper, whose collection now forms part of that contained in the Museum at Lehigh University, at Bethlehem. The crystals, of the usual axe-like shape and generally of small size, were found in crystalline hornblende at an abandoned ore pit, on a farm three miles north of Bethlehem, Northampton County.

## 44. BIOTITE. (83)

This mineral, as a rock-constituent, is found at many localities in the vicinity of Philadelphia. Two varieties from the vicinity of Forty-fourth street and Baltimore avenue, have been analyzed by Dr. Genth (a) and Mr. F. A. Genth, Jr., (b)<sup>2</sup>. Both varieties of a brownish-black color.

	a.	b.
Ignition.....	2.97.....	2.07
Fluorine.....	Not determined.	
Silicic acid.....	36.02.....	36.19
Titanic acid.....	2.20.....	1.68
Alumina.....	18.95.....	21.66
Ferric oxide.....	3.17.....	2.64
Ferrous oxide.....	16.44.....	16.96
Cupric oxide.....	0.10.....	trace
Manganous oxide....	0.67.....	0.52
Magnesia.....	9.39.....	9.36
Lithia.....	trace .....	trace
Soda.....	0.29.....	0.45
Potash.....	9.25.....	8.51
	<hr/> 99.45	<hr/> 100.04

In Berks Co. it occurs near Huff church, and one mile N. E. of Pricetown.

<sup>1</sup> On crystals of Axinite from a locality near Bethlehem, Pa., etc. B. W. Frazier, Am. J. Sci., XXIV, 439.

<sup>2</sup> Geol. of Penna., C 6, 131.

## 45. MUSCOVITE. (84)

Fine specimens, enclosing magnetite, occur at Nottingham, Chester Co. In Berks Co. it is found at Ohlinger dam, Oley tunnel mine, Clymer mine and in rhombohedral crystals (?) at Huff church.

## 46. LEPIDOLITE.

This mineral, with a number of others, was sent to me for determination. It is found as a deep incrustation upon the quartz-ore rock at the Big Hill, Cornwall, Lebanon Co. Upon examination I found it to be lepidolite.

## 47. WERNERITE. (86)

Crystals  $\frac{1}{2}$  inch in length, of a resinous lustre, occur at Fritz Island, Berks Co.

## 48. CANCRINITE.

There is a specimen of cancrinite in the Museum of the Academy of Natural Sciences of Philadelphia with the indefinite label "Chester Co., Pa."

## 49. ANORITE.

Occurs with corundum  $\frac{1}{2}$  mile S. of the Black Horse tavern, in Delaware Co.

## • 50. OLIGOCLASE. (89)

In Berks Co. it is found at Hill church, at Little dam, at the Nestor and Gilbert mines, Washington twp., at Siesholtzville,

and in Exeter twp. The oligoclase from Black Horse tavern has been analyzed by Dr. Genth<sup>1</sup> who found :

Silicic acid.....	58.22.....	58.62
Alumina .....	22.92.....	23.55
Ferric oxide.....	0.17.....	0.17
Magnesia....	0.25.....	0.46
Lime .....	3.02.....	3.23
Baryta.....	2.57.....	2.54
Soda .....		3.68
Potash.....		7.06
Ignition .....	1.59.....	1.49
		<hr/>
		100.80

Dr. Genth<sup>2</sup> also analyzed the variety, *moonstone*, from Schofield's farm  $\frac{1}{2}$  mile W. of Elwyn station, Delaware Co.:

Silicic acid.....	66.24
Alumina .....	20.91
Ferric oxide.....	trace
Lime.....	1.61
Soda .....	10.14
Potash .....	1.12
Ignition .....	0.59
	<hr/>
	100.61

Oligoclase from Van Artsdalen's quarry, Bucks Co., has also been analyzed by Dr. Genth<sup>3</sup> who found :

Ignition .....	0.23
Silicic acid.....	62.58
Alumina.....	23.27
Ferric oxide.....	0.23
Magnesia .....	0.15
Lime.....	4.88
Soda .....	8.05
Potash .....	1.04
	<hr/>
	100.43

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<sup>1</sup> Geol. of Penna., C 5, 116.

<sup>2</sup> *Ibid* C 104.

<sup>3</sup> *Ibid* C 6, 104.

## 51. LABRADORITE. (88)

Is found at Antietam Lake and possibly at Ohlinger dam, Berks Co.

## 52. ORTHOCLASE. (92)

This mineral is found at many localities in Delaware and Chester Counties, and at Antietam Lake, Ohlinger dam, Huff church, Mount Penn and Siesholtzville in Berks Co. The latter has been analyzed Dr. W. P. Headden<sup>1</sup> and resulted as follows :

Silica.....	66.86
Alumina.....	18.97
Ferrous oxide.....	0.62
Magnesia .....	trace
Lime.....	1.41
Soda.....	3.61
Potash.....	10.04
	<hr/>
	101.51

Dr. Genth and Mr. F. A. Genth, Jr.,<sup>2</sup> have analyzed adularia and red orthoclase from Upper Avondale, Delaware Co., with the following results :

a. Red Orthoclase by F. A. Genth, Jr.

b. Adularia by F. A. Genth.

	a	b
Silicic acid.....	64.53.....	65.84
Alumina.....	19.64.....	19.50
Ferric oxide.....	trace.....	
Magnesia.....	0.25.....	
Lime.....	0.16.....	trace
Soda.....	1.77.....	3.93
Potash.....	13.62.....	10.69
Baryta.....		0.08
Ignition.....	0.71.....	0.22
	<hr/>	<hr/>
	100.68	100.26

<sup>1</sup> Geol. of Penna., D, p. 6.

<sup>2</sup> Geol. of Penna., C 5, 118.

I have observed a very interesting crystalline variety at the French Creek mines, St. Peter's, Chester Co. Here it occurs in radiating columnar crystals of light green to light pink color. Many of the columnar crystals measure 6<sup>cm</sup> in length.

The following is an analysis by Dr. F. A. Genth, Jr.<sup>1</sup>:

Ignition.....	0.67
SiO <sub>2</sub> .....	62.68
Fe <sub>2</sub> O <sub>3</sub> .....	0.23
Al <sub>2</sub> O <sub>3</sub> .....	20.90
CaO.....	0.15
Na <sub>2</sub> O.....	None
K <sub>2</sub> O.....	15.99

Sp. gr. 2.528.

100.62

### 53. ALBITE. (91.)

Albite from Lenni, Delaware Co., has been analyzed by Mr. G. M. Lawrence,<sup>2</sup> who found:

Silicic acid.....	65.43
Alumina.....	20.70
Magnesia.....	0.68
Lime.....	1.11
Soda.....	9.85
Potash.....	0.70
Ignition.....	1.71

100.18

Beautiful colorless crystals are found in red orthoclase at Upper Avondale, Delaware Co., and an analysis by Dr. Genth<sup>3</sup> resulted:

Silicic acid.....	68.52
Alumina.....	19.44
Soda.....	11.42
Potash.....	0.65

Sp. gr. 2.604.

100.03

<sup>1</sup> Proc. Am. Phil. Soc., XXIV, 43.

<sup>2</sup> Geol. of Penna., C 5, 116.

<sup>3</sup> *Ibid*, C 5, 117.

These crystals are associated with minute, but beautifully modified, colorless and slightly greenish crystals of beryl, crystals of muscovite, black tourmaline and calcite.

In Berks Co., albite occurs at Siesholtzville, Little Dam, Hill church, and in Exeter and Washington twps. A variety from S. Dana's place, near Morrisville, Bucks Co., analyzed by Dr. Genth,<sup>1</sup> gave:

Ignition .....	0.53
Silicic acid.....	67.01
Alumina.....	19.44
Ferrie oxide.....	0.52
Magnesia .....	0.24
Lime.....	1.71
Soda.....	10.48
Potash .....	3.30
	<hr/>
	100.23

#### 54. TOURMALINE. (95)

Black tourmaline, in crystals, is found at New Hope, Bucks Co., and at Rossville, York Co. In Lehigh Co., in large perfect crystals imbedded in feldspar at the Corundum locality, near Shimersville; brown crystals in hornblende at the Bethlehem Iron Co's mine  $1\frac{1}{4}$  miles N. W. of Shimersville, and of a brownish-black color on Lehigh Mt., 2 miles south of Allentown.

Dr. Smith<sup>2</sup> has made a partial analysis of the brownish-black variety from Lehigh Mt., and finds:

SiO <sub>2</sub> .....	39.41
Al <sub>2</sub> O <sub>3</sub> .....	19.46
Fe <sub>2</sub> O <sub>3</sub> .....	8.44
FeO .....	7.00
CaO .....	3.49
MgO .....	2.14
B <sub>2</sub> O <sub>3</sub> .....	9.00
Alkalies.....	
Ignition.....	2.19

<sup>1</sup> Geol. of Penna., C 6, 101.

<sup>2</sup> Am. Chem. Jour., V, 275.

## 55. GEHLENITE.

According to Mr. J. S. Diller<sup>1</sup> this mineral, in square prisms, occurs in furnace slag near McVile, Armstrong Co.

## 56. CYANITE. (101)

Of a green color, it occurs near the London Grove Meeting House, and at a quarry  $\frac{1}{2}$  mile S. of the Poor House quarries, Chester Co.

## 57. DATOLITE.

The only occurrence of this mineral in Pennsylvania is at the Fritz Island mine S. of Reading.

## 58. TITANITE. (102.)

Clove-brown crystals are found in magnetite,  $1\frac{1}{2}$  miles S. of Huff's church, Hereford twp., Berks Co., and liver-brown crystals in the hornblende at Tioga station, Philadelphia. Two analyses of the latter by Dr. Genth<sup>2</sup> gave:

	By Sodium Carb.	By Hydrofluoric acid.
Ign. ....	.99.....	.87
SiO <sub>2</sub> .....	30.60.....	—
TiO <sub>2</sub> .....	37.23.....	37.02
Al <sub>2</sub> O <sub>3</sub> .....	0.67.....	0.47
FeO.....	0.90.....	0.90
MnO.....	trace.....	trace
MgO.....	0.24.....	trace
CaO.....	29.50.....	29.38
	<hr/>	
	100.13	

Sp. gr. 3.596.

<sup>1</sup> Am. J. Sci., 37, 220.

<sup>2</sup> Geol. of Penn., C 6, 130.

A dark-brown titanite in well defined crystals, is found 2 miles from Hosensack station, Lower Milford twp., Lehigh Co., and has been analyzed by Messrs. Smith and Knerr<sup>2</sup> with the following results:

SiO <sub>2</sub> .....	34.87
TiO <sub>2</sub> .....	43.41
CaO.....	21.75
	<hr/>
	100.03

Sp. gr. 3.45.

#### 59. STAUROLITE. (103,)

On the "Barrens" N. of West Chester it is found in small crystals and at Taylor's quarries one mile N. of West Chester.

#### 60. CHRYSOCOLLA. (104)

This mineral is found sparingly at the Fritz Island mine, Berks County.

#### 61. NEOLITE. (105)

I have been able to identify this mineral as occurring at the "Big Hill," Cornwall, Lebanon Co. Color grayish-white; structure radiated.

#### 62. ANTHOSIDERITE.

This mineral occurs at the Dry Hollow mine, Huntingdon Co.

#### 63. PECTOLITE.

On granite, it is found at the Frankford quarries, Philadelphia, and in gray acicular crystals associated with stilbite, on limestone, it occurs at Hosensack station, Lehigh Co.

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<sup>2</sup> Am. Chem. Jour., VI, 412.

An analysis of this latter mineral has been made by Messrs. Smith and Knerr<sup>1</sup> with the following result :

SiO <sub>2</sub> .....	55.17
Fe <sub>2</sub> O <sub>3</sub> .....	0.80
CaO.....	30.00
K <sub>2</sub> O.....	0.37
Na <sub>2</sub> O.....	9.02
H <sub>2</sub> O.....	4.63
	<hr/>
	99.99

Sp. gr. 2.6.

#### 64. CALAMINE. (106)

Last summer (1888), I obtained some good crystals of a dark brown color on limonite and coating the interior of geodes, from an abandoned mine shaft on the land of S. von Steuben,  $\frac{1}{4}$  mile W. of Dryland station, Northampton Co.

At the Keystone Zinc mine, near Birmingham, Blair Co., it is found associated with sphalerite and galenite. Several years ago I analyzed the calamine from the Ueberroth mine, Friedensville, Lehigh Co., which I append herewith, as I believe this to be the first published analysis of calamine from this old and well-known locality.

Si <sub>2</sub> O <sub>3</sub> .....	24.32
Fe <sub>2</sub> O <sub>3</sub> .....	2.12
H <sub>2</sub> O.....	7.86
ZnO.....	65.05
	<hr/>
	99.35

#### 65. APOPHYLLITE. (106)

Fine crystals of apophyllite are found at the French Creek mines, St. Peter's, Chester Co., where they occur in large groups, some of which measure two feet square. I have some

<sup>1</sup> E. F. Smith and E. B. Knerr, Am. Chem. Jour., VI, 411.

very perfect crystals which measure 14<sup>mm</sup>, and figures like fig. 387 in Dana are frequently met with.

An analysis of very pure material afforded me (a)

	a.	b.
SiO <sub>2</sub> .....	51.63.....	51.88
CaO.....	25.42.....	25.31
K <sub>2</sub> O.....	6.27.....	6.30
H <sub>2</sub> O.....	16.58.....	16.80
	<hr/> 99.90	<hr/> 100.29

Dr. Smith<sup>1</sup> (b) has also analyzed this mineral and I add his results for comparison.

Mr. B. Sadtler, Jr.,<sup>2</sup> gives an analysis of this mineral from Fritz Island. Crystals colorless and of pearly lustre.

H <sub>2</sub> O.....	16.75
SiO <sub>2</sub> .....	51.02
Fe <sub>2</sub> O <sub>3</sub> .....	1.49
CaO.....	24.40
K <sub>2</sub> O.....	5.87
Fl.....	0.40
	<hr/> 99.93

H. 4 to 4-5, Sp. gr. 2.5.

## 66. ALLOPHANE. (107)

As white, mammillary and stalactical incrustations on limonite, it found near the village of Balliettsville 7 miles from Allentown, Lehigh Co. An analysis by Dr. Smith<sup>3</sup> afforded :

H <sub>2</sub> O.....	40.86
SiO <sub>2</sub> .....	21.39
Al <sub>2</sub> O <sub>3</sub> .....	35.20
CaCO <sub>3</sub> (MgCO <sub>3</sub> ). ..	1.96
	<hr/> 99.41

<sup>1</sup> E. F. Smith, Am. Chem. Jour., VI, 415.

<sup>2</sup> B. F. Sadtler, Jr., *Ibid* IV, 357.

<sup>3</sup> E. F. Smith, *Ibid* V, 272.

## 67. MESOLITE. (308)

No new localities of this zeolite have been reported since the publication of Dr. Genth's report. I append herewith an analysis of the Fritz Island mineral made by Mr. B. Sadtler, Jr.<sup>1</sup>:

H <sub>2</sub> O.....	16.01
SiO <sub>2</sub> .....	43.29
Fe <sub>2</sub> O <sub>3</sub> .....	trace.
Al <sub>2</sub> O <sub>3</sub> .....	25.02
CaO.....	12.15
Na <sub>2</sub> O..	3.40
	<hr/>
	99.87

H. 2.5 to 3. Sp. gr. 2.4.

## 68. ANALCITE.

At Cornwall, Lebanon Co., there occurs a greenish-white mineral in cavities in the magnetite, which I have carefully examined and which proves to be analcite. On account of the limited quantity of mineral I was unable to make a complete quantitative analysis. It is also found at the Falls of the Schuylkill, near Philadelphia.

## 69. CHABAZITE. (108)

A few small crystals have been found in the quarries at Leiper-ville, Delaware Co. According to Mr. Lewis Palmer it occurs in red crystals in a hornblendic gniess at Waterville, near Chester, and at Upland, Delaware Co.

Mr. Sadtler<sup>2</sup> gives an analysis of colorless crystals of a vitreous lustre, from the Fritz Island mine, Berks Co.:

H <sub>2</sub> O.....	20.21
SiO <sub>2</sub> .....	50.28
Al <sub>2</sub> O <sub>3</sub> .....	17.83
CaO...	6.96
Na <sub>2</sub> O.....	2.43
K <sub>2</sub> O.....	2.40
Fe <sub>2</sub> O <sub>3</sub> .....	trace
MgO.....	0.22
	<hr/>
	100.33

H. 4. Sp. gr. 2.3.

100.33

<sup>1</sup> B. Sadtler, Jr., Am. Chem. Jour., IV, 356.

<sup>2</sup> B. Sadtler, Jr., *Ibid* IV, 357.

## 70. STILBITE. (109)

I have been able to obtain some very good crystals of this mineral from St. Peter's, Chester Co., where it occurs very sparingly, lining cavities and generally associated with calcite. Some of the largest crystals measure 35<sup>mm</sup>.

An analysis of some pure material gave me:

SiO <sub>2</sub> .....	58.00
Al <sub>2</sub> O <sub>3</sub> .....	13.40
Fe <sub>2</sub> O <sub>3</sub> .....	trace
CaO.....	7.80
MgO.....	1.40
K <sub>2</sub> O.....	1.03
Na <sub>2</sub> O.....	trace
H <sub>2</sub> O ...	18.30
	—
	99.93

It is found on gniess at the quarry Forty-ninth and Leiper streets, Frankford ; at Ridley, Delaware Co., and in Berks Co., at the following localities: Jones' mine, Wheatfield mine, Raudenbush mine, and in radiating crystalline masses S. of Boyertown and at Ohlinger dam.

In Lehigh Co. it is found in large globular radiating concretions upon the limestone on the farm of Jacob Schell, near Hossensack station. An analysis by Dr. Smith<sup>1</sup> gave :

(CaO.....	9.00) <sup>2</sup>
SiO <sub>2</sub> .....	55.31
Al <sub>2</sub> O <sub>3</sub> .....	14.88
Na <sub>2</sub> O.....	1.66
H <sub>2</sub> O.....	18.47
	—
	99.32

Sp. gr. 2.21.

<sup>1</sup> E. F. Smith, Am. Chem. Jour., V, 227.

<sup>2</sup> I have added this quantity, having been omitted by the printer of the A. C. J.

Messrs. Brunner and Smith<sup>1</sup> have analyzed this mineral from the Wheatfield mines, near Fritztown, where it occurs in radiating, fibrous, pearly white masses upon a trap rock.

H <sub>2</sub> O.....	19.42
SiO <sub>2</sub> .....	57.49
Al <sub>2</sub> O <sub>3</sub> .....	13.03
CaO.....	8.06
MgO.....	trace
Na <sub>2</sub> O.....	1.36
	<hr/>
	99.36

Sp. 2.2.

Stilbite from Raudenbush and Fegley's mine, Berks Co., has been analyzed with the following results:

	a	b	c
H <sub>2</sub> O.....	18.46	18.60	18.97
SiO <sub>2</sub> .....	58.01	58.15	57.54
Al <sub>2</sub> O <sub>3</sub> .....	13.75	12.47	12.67
CaO.....	7.76	9.82	7.85
MgO.....	1.38		1.72
K <sub>2</sub> O.....	0.42	0.43	1.09
Na <sub>2</sub> O.....	trace	trace	trace
	<hr/>	<hr/>	<hr/>
	99.78	99.47	99.84

a and b Raudenbush, by Mr. F. P. Davidson.<sup>2</sup>

c Fegley's Mine, by Messrs. Hoskinson and Brunner.<sup>3</sup>

## 71. HEULANDITE. (110)

This zeolite, rather rare in Pennsylvania, is found associated with quartz, calcite, hornblende, etc., near Adamstown, Lancas-

<sup>1</sup> D. B. Brunner and E. F. Smith, *Am. Chem. Jour.*, V, 280.

<sup>2</sup> *Am. Chem. Jour.*, VI, 414.

<sup>3</sup> *Ibid* VI, 414.

ter Co. The crystals show the following planes :  $\infty P$ ,  $(\infty P \infty)$ ,  $0 P$ ,  $-P$ ,  $-2 P \infty$ ,  $(2 P \infty)$ ,  $(P \infty)$  An analysis by Messrs. Knerr and Schoenfeld<sup>1</sup> afforded :

H <sub>2</sub> O.....	16.61
SiO <sub>2</sub> .....	57.68
Al <sub>2</sub> O <sub>3</sub> .....	17.05
CaO.....	6.78
MgO.....	0.69
K <sub>2</sub> O....	1.13
Na <sub>2</sub> O.....	trace

Sp. gr. 2.2.	99.94
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## 72. TALC. (113)

Large quantities of talc are mined in the counties of Delaware, Chester, Lancaster and Northampton. The so-called "light-green variety of serpentine" found near Easton proves, upon examination, to be talc.

## 73 PYROPHYLLITE. (111)

This mineral is found in the coal slates at the North Mahanoy colliery, near Mahanoy City, Schuylkill Co.

## (74.) SERPENTINE. (113)

Mr. H. F. Keller<sup>2</sup> has analyzed two specimens of serpentine from Berks Co., with the following results :

	Ruth's Mine.	Wheatfield Mine.
Silicic oxide.....	42.14.....	41.46
Ferrous oxide.....	2.06.....	0.99
Magnesium oxide.....	41.61.....	44.68
Calcium oxide.....	trace.....	—
Water.....	14.20.....	14.07
	100.01	101.20

<sup>1</sup> E. B. Knerr and J. Schoenfeld, *Ibid* VI, 412.

<sup>2</sup> Proc. Am. Phil. Soc., XXIII, 42.

## 75. CHLOROPAL.

Dr. Valentine sent me a greenish, earthy mineral, which he found associated with the magnetite, at Big Hill, Cornwall, Lebanon Co. Upon examination I found it to be chloropal.

On Lehigh Mt., S. of Allentown, this mineral is found at many of the "search" pits dug in searching for limonite. In the American Chemical Journal, Vol. V, p. 278, Dr. E. F. Smith gives twelve analyses of this mineral, four of which are here appended.

	Yellow.	Yellowish-green.
H <sub>2</sub> O.....	19.61.....	20.79
SiO <sub>2</sub> .....	40.20.....	41.16
Fe <sub>2</sub> O <sub>3</sub> .....	39.52.....	30.79
FeO.....	0.40.....	0.21
P <sub>2</sub> O <sub>5</sub> .....	trace.....	Al <sub>2</sub> O <sub>3</sub> .. 2.05
MgO.....	" .....	—
K <sub>2</sub> O.....	" .....	4.54
	—	—
	99.73	99.54

	Brownish-yellow.	Brown.
H <sub>2</sub> O .....	19.27.....	17.71
SiO <sub>2</sub> .....	42.37.....	43.54
Fe <sub>2</sub> O <sub>3</sub> ....	38.17.....	39.52
FeO.....	trace.....	—
P <sub>2</sub> O <sub>5</sub> .....	" .....	100.77
MgO.....	" .....	—
	—	—
	99.81	

In Berks Co. it is found in the neighborhood of Longswamp church.

## 76. GLAUCONITE. (113)

Lining cavities in feldspar, it is found at the French Creek

mines, St. Peter's, Chester Co. An analysis by Messrs. Knerr and Schoenfeld<sup>1</sup> resulted :

H <sub>2</sub> O .....	8.43
SiO <sub>2</sub> .....	52.86
Al <sub>2</sub> O <sub>3</sub> .....	7.08
Fe <sub>2</sub> O <sub>3</sub> .....	7.20
FeO.....	19.48
MgO .....	2.90
CaO.....	trace
K <sub>2</sub> O.....	2.23
Na <sub>2</sub> O.....	trace
	<hr/>
	100.18

Sp. gr. 2.2.

#### 77. LEIDYITE.

This mineral of grass-blue or green color in verruciform incrustations of fine scales and resinous lustre is found at Leiperville, Delaware Co. Named after the eminent anatomist Dr. Joseph Leidy. It has been analyzed by Dr. Koenig<sup>2</sup> who found :

SiO <sub>2</sub> .....	51.41
Al <sub>2</sub> O <sub>3</sub> .....	16.82
FeO.....	8.50
MgO.....	3.07
CaO.....	3.15
H <sub>2</sub> O.....	17.08
	<hr/>
	100.03

#### 78. DEWEYLITE. (117)

This mineral is found at Ruth's mine, in Berks Co., and at Brinton's quarry, S. of West Chester, Chester Co. The former

<sup>1</sup> E. B. Knerr and J. Schoenfeld, Am. Chem. Jour., VI, 442.

<sup>2</sup> G. A. Koenig, Proc. Acad. Natl. Sci., 1878, 84.

mineral has been analyzed by Messrs. Brunner and Smith<sup>1</sup> with the following results:

H <sub>2</sub> O.....	19.49.....	19.03
SiO <sub>2</sub> ..	45.65.....	42.34
Fe <sub>2</sub> O <sub>3</sub> ..	0.20.....	1.39
MgO.....	34.38.....	36.77
CaO.....	trace.....	trace
	<hr/>	<hr/>
	99.69	99.53

Mr. H. F. Keller<sup>2</sup> has analyzed a yellow variety of waxy lustre:

Silicic oxide.....	39.32
Ferrous oxide.....	0.51
Calcium oxide.....	trace
Magnesium oxide.....	41.14
Water.....	18.41
	<hr/>
	99.38

## 79. GENTHITE. (117)

There is a very interesting locality for this nickel silicate at a few hundred feet N. of the steatite quarry at Lafayette, Montgomery Co. Here it occurs on an actinolite rock in thin coatings, which, under the microscope, show the mammillary and stalactitic structure characteristic of the species.

## 80. AQUACREPTITE. (122.)

This mineral is found in partially decomposed gneiss on Lansdowne Ave., 1½ miles W. of Hestonville, Philadelphia.

<sup>1</sup> D. B. Brunner and E. F. Smith, Am. Chem. Jour., V, 280.

<sup>2</sup> Proc. Am. Phil. Soc., XXIII, 41.

## 81. FAHLUNITE.

In irregular masses of pale green color in orthoclase, this mineral occurs at McKinney's quarry, Rittenhouse street and at Nester & Shelmire's quarry on Wayne street, Germantown.

## 82. DAMOURITE. (122.)

In Berks Co. this mineral is found at the Wheatfield mine, Merkle farm, Oley twp., Fox's farm, Ruscombmanor twp., and of a yellowish green color at the Rockland Forges.

## 83. HISINGERITE. (128.)

The variety, *Degeræite*, is found at the Dry Hollow mine, in Huntingdon Co.

## 84. PENNINITE. (130)

*Kammererite* is found at the Wheatfield mine, near Fritztown, Berks Co.

## 85. RIPIDOLITE. (131)

This mineral occurs, associated with magnetite, at the Cornwall mines, Lebanon Co., and in Berks Co. at the Fritz Island and Jones mines.

86. PHILADELPHITE.<sup>1</sup>

This vermiculite occurs at three localities in Philadelphia, (a) near Wayne station, on the Germantown R. R., (b) at McKinney's quarry, on Wayne street, and in Germantown. It is found in plates of brown color in seams in an altered hornblende.

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<sup>1</sup> Proc. M. & G. Soc., Acad. Natl. Sci., 1877-78, p. 74.

Analyses by Mr. Haines (a) and the late Prof. H. Carvill Lewis (b) gave :

	a.	b.
SiO <sub>2</sub> .....	38.79.....	35.73
TiO <sub>2</sub> .....		1.03
Al <sub>2</sub> O <sub>3</sub> .....	14.78.....	15.77
Fe <sub>2</sub> O <sub>3</sub> .....	20.30.....	19.46
V <sub>2</sub> O <sub>3</sub> .....		0.37
FeO.....	2.04.....	2.18
MnO.....		0.50
NiO.....	}	0.06
CoO.....		—
CuO.....		0.08
MgO.....	11.40.....	11.56
CaO.....	1.03.....	1.46
Na <sub>2</sub> O.....	0.77.....	0.90
Li <sub>2</sub> O.....		trace
K <sub>2</sub> O.....	6.75.....	6.81
P <sub>2</sub> O <sub>5</sub> .....		0.11
Cl.....		trace
H <sub>2</sub> SO <sub>4</sub> .....		trace
H <sub>2</sub> O.....	4.27.....	4.34
	<hr/>	<hr/>
	100.13	100.45

Sp. gr. (in alcohol) 2.78—2.96.

### 87. COLUMBITE. (137)

A beautiful doubly-terminated crystal,  $\frac{7}{8}$  of an inch in length by  $\frac{1}{2}$  an inch in width, of a black color, was found in 1882 at the Mineral Hill locality, Delaware Co.

### 88. EUXENITE.

Last Fall this mineral was sent to me for identification and upon examination, I found it to be the very rare mineral, euxenite. It is an imperfect crystal about  $\frac{3}{4}$  of an inch in length, and of a brownish black color. I have been unable to ascertain the exact locality.

## 89. APATITE. (138)

This lime phosphate is found at Ridley, Delaware Co., and at Ruth's mine in Berks Co.

## 90. ERYTHRITE.

This cobalt arsenate occurs sparingly, generally forming an incrustation upon the pyroxene and calcite, at the French Creek mines, St. Peter's, Chester Co. At the Wheatley lead mines  $2\frac{1}{2}$  miles S. of Phoenixville, Chester Co., it is found in veins and incrustations, which, under the microscope, show minute globular crystals. The latter locality was discovered by Mr. L. Woolman. These two localities are the only ones, so far recorded, in North America.

## 91. WAVELLITE. (142)

I have observed this mineral in botryoidal and hemispherical masses at the Wheatley lead mines  $2\frac{1}{2}$  miles S. of Phoenixville, Chester Co. It is occasionally found at the Wheatfield mine, Berks Co. In beautiful, colorless, radiating nodules, on limonite, it is found on the farm of Jacob Stine, in Upper Milford, two miles S. of Macungie, Lehigh Co. Dr. Smith<sup>1</sup> has analyzed this mineral with the following result:

$\text{Al}_2\text{O}_3$ .....	36.66
$\text{P}_2\text{O}_5$ .....	34.14
$\text{H}_2\text{O}$ .....	28.32
Fl.....	trace
Limonite.....	0.60
	<hr/>
	99.72

## 92. DUFRENITE.

## 93. CACOXENITE.

These two hydrous phosphates are found at the Dry Hollow mine, Huntingdon Co.

<sup>1</sup> E. F. Smith, Am. Chem. Jour., V, 273.

## 94. AUTUNITE. (144)

This uranium-lime phosphate is found on orthoclase at Avondale, Delaware Co.

## 95. BARITE. (145)

This mineral is found at many localities throughout the State. In Huntingdon Co on the Broad Top Mountain; in Franklin Co. on Hoving's farm, 3 miles S. E. of and 3 miles N. E. of Waynesboro', and in large white cleavable masses at Lancaster station; in Blair Co., associated with galenite and sphalerite, at the Keystone zinc mine, near Birmingham; in Fulton Co. at Dyson Fraker's farm, near Fort Littleton; in Berks Co. at Mt. Aetna, in Tulpehocken twp.; in Bedford Co., in small tabular crystals at Bridgeport.

The following analyses of barite were made at the Laboratory of the Second Geological Survey of Pennsylvania :

	<i>a.</i>	<i>b.</i>	<i>c.</i>	<i>d.</i>	<i>e.</i>
Sulphate of baryta.....	95.22....	96.91....	97.08....	95.91....	98.65
Sulphate of strontia.....	none.....	none.....	none.....	none.....	none
Oxide of iron and alumina....	0.38....	0.31....	0.76....	0.24....	0.14
Oxide of Manganese.....	0.05....	—	—	—	—
Lime.....	0.59....	trace	—	0.17	trace
Magnesia.....	0.18....	trace....	trace....	0.11....	trace
Carbonic acid.....	0.65....	—	—	—	—
Water.....	0.23....	0.08....	0.32....	0.09....	0.20
Silicic Acid.....	2.45....	2.35....	1.74....	2.80....	1.11
	<u>99.75</u>	<u>99.65</u>	<u>99.90</u>	<u>99.32</u>	<u>100.10</u>

*a* and *b* near Fort Littleton, Montgomery Co.

*c* Sinking Valley, Blair Co.

*d* and *e* near Waynesboro', Franklin Co.

In Montgomery Co. it occurs at Hitner's marble quarries, in Plymouth twp., and at the Ecton mine, near Shannonville.

## 96. GYPSUM. (148)

I have observed gypsum in tabular crystals and massive in the

cavities of limestone at Smith's quarry, Bushkill creek, Easton. Beautiful hexagonal crystals are found at Jones' mine, at Bushong's mine, and at Boyertown, Berks Co., and as an efflorescence upon gniess at Darby, Delaware Co.

#### 97. EPSOMITE. (148)

In small, colorless, acicular crystals it occurs at Sideling Hill tunnel, E. Broad Top R. R., Huntingdon Co.

#### 98. ALUNOGEN. (150)

This hydrous alumina sulphate is found along the banks of a small stream in the valley near Mahanoy City, Schuylkill Co.

#### 99. HALOTRICHITE.

In fine incrustations on hornblendic gniess on the river drive below "Strawberry Mansion," Fairmount Park, Philadelphia.

#### 100. COPIAPITE.

This mineral is found at the same locality as alungen (Mahanoy City.)

#### 101. CALCITE. (152)

This species is very widely distributed throughout the State, and on account of its very frequent occurrence it is seldom reported. The majority of the localities have already been described by Dr. Genth. Fine crystals, of the scalenohedron variety, called *dog-tooth spar*, occur in Berks Co. at Fritz Island, Big Dam and Luckenbill's cave. I have obtained the following varieties at the French Creek mines, St. Peter's, Chester Co.:

*Dog-tooth spar*, fine transparent crystals of light yellow color.  
*Iceland spar*, some of which is equal to that from Rossie, N. Y.,

and large single rhombohedra quite transparent and of dark yellow color. These latter generally occur on the apophyllite.

Other localities in Berks Co. are Siesholtzville, Shellington, Wernersville, Wheatfield mine, Boyertown, and a pink variety in blue quartz on Leinbach's hill W. of Reading; and at Adamstown, Lancaster Co., associated with heulandite.

### 102. DOLOMITE. (154)

In small rhombs incrusting limestone, this mineral is sometimes met with at the Ueberroth zinc mine, Friedensville, Lehigh Co.

### 103. MAGNESITE. (158)

This mineral is found at Spangsville, Earl twp., Berks Co., and in chlorite schist  $\frac{1}{2}$  mile S. of Paoli, Chester Co.

### 104. SIDERITE. (159)

Siderite as an ore is found at the Barber mine S. of Alburtis, Lehigh Co., and has been analyzed by Mr. M'Creath and found to contain ;

Ferrous oxide.....	45.064
Ferrie oxide.....	1.553
Bisulphide of iron.....	0.457
Oxide of maganese.....	1.150
Alumina.....	1.643
Lime.....	0.644
Magnesia .....	1.495
Carbonic acid.....	29.330
Phosphoric acid.....	0.142
Sulphuric acid.....	0.061
Water .....	0.420
Insoluble residue.....	17.575
	<hr/>
	99.534

In Springfield twp., Montgomery Co., associated with talc and magnetite. Near Mechanicsville, Clarion Co., small crystals are found coating the interior of geodes. In Berks Co. at the Weaver mine in Oley twp., and in fine crystals in the interior of nodules of amorphous siderite at Dunbar, Fayette Co.

#### 105. ARAGONITE. (162)

Associated with deweylite and serpentine, it is found at Ruth's mine; abundantly in small crystals and fibrous stalactites at the Crystal cave, Virginsville, and at the Wheatfield mine, Berks Co., and very rarely in fine groups of radiating acicular crystals at Cornwall, Lebanon Co. In silky snow white masses and fibres associated with serpentine, it is found at Sherrer's talc quarry on the Delaware road one mile north of Easton.

#### 106. HYDROMAGNESITE. (164)

This mineral, associated with brucite, is found at Sinking Spring, Spring twp., Berks Co., and at Carter's chrome mine, Little Britain twp., Lancaster Co.

#### 107. AURICHALCITE.

This beautiful mineral is found at Jones' mine and at the Fritz Island mine, Berks Co.

#### 108. MALACHITE. (166)

This copper carbonate is quite abundant in many localities along the Triassic red sandstone belt, which crosses the south eastern portion of the State.

I have a very fine specimen of malachite, with quartz, which was found a number of years ago at Flint Hill, Lower Saucon twp., Northampton Co.

A few months ago I found this mineral as an incrustation upon

the conglomerate, a short distance from Leithsville, Lower Saucon twp., Northampton County. It was formerly mined at this locality and a considerable quantity taken out; however, on account of the small percentage of copper ( $1\frac{3}{8}\%$ ), it was not a financial success, and the mine was abandoned. In York Co. it occurs at Altland's mine  $2\frac{1}{2}$  miles S. W. of Wellsville; in Adams Co., with epidote at Bechtel's opening, Hamilton twp.; at Bonnoughton, at Mills' mine  $1\frac{1}{2}$  miles N. E. of Fairhill; on argillaceous sand rock  $1\frac{1}{2}$  miles S. W. of Fairfield; on porphyry  $1\frac{1}{4}$  miles S. E. of D. Snyder's farm, and near Waynesboro; in Nicholson twp., Wyoming Co.; in Pike Co. small quantities of malachite and sphalerite are found in Middle Smithfield twp.; in Berks Co., at the Wheatfield mine, near Fritztown, at the "Big Dam," 3 miles S. of Reading; at Snydersville in Exeter twp., and near Bernsville. Some good specimens have been obtained at the French Creek mines, St. Peter's, Chester Co.

#### 109. AZURITE, (167.)

At the Upper Salford mine in Montgomery Co., and with chalcopyrite and malachite, it is found near Sellersville. Associated with native copper and chrysocolla, it is found on Benchoff's farm on the Emmetsburg turnpike, near Fairfield, Adams Co.

#### 110. RANDITE.

This hydrous uranium-lime carbonate is found at a quarry in Frankford, Philadelphia, N. E. of Adams street.

#### 111. LANSFORDITE<sup>1</sup> *n. sp.*

This new species, a hydrous magnesium carbonate, was found stalactical in an anthracite mine at Lansford, near Tamaqua,

<sup>1</sup> F. A. Genth, Zeit. f. Kryst., XIV, 255.

Schuylkill Co. The mineral is translucent and resembles parafine; structure crystalline; lustre, vitreous.

Hardness 2-5. Sp. gr. 1.54-1.692.

## COMPOSITION.

CO <sub>2</sub> .....	18.90
MgO .....	23.18
H <sub>2</sub> O .....	57.79
	<hr/>
	99.87

## 112. DOPPLERITE.

This hydro-carbon compound was obtained from an excavation near the court-house at Scranton, Lackawanna Co., and is described by Prof. H. C. Lewis in the Proc. Min. Geol. Sec. Acad. Natl. Sci., 1880-81, 19.

## ERRATA.

- 
- Page 2, second line under sulphur, for zine read zinc.  
 “ 12, second line under pyrite, for “galenatē” read galenite.  
 “ 13, eleventh line from bottom, for Windsor, Greenwich  
     read Windsor and Greenwich.  
 “ 13, first line from bottom, for crystals on read crystals  
     and on.  
 “ 22, second line under lepidolite, for quartzore read quartzose.

## TABLE

SHOWING THE AVAILABILITY OF THE VARIOUS MINERALS AT  
THE PRINCIPAL MINES.

### ABBREVIATIONS.

- 1** indicates, *poor* specimens may be obtained from the waste dumps.
- 2** indicates, *fair* specimens may be obtained.
- 3** indicates, *good* specimens may be obtained, as the mine is in operation.
- Z** indicates, the mine produced principally zinc ores.
- SL** Silver-lead ores. **Ch** chrome ores. **Cr** corundum. **L** lead ores. **I** iron ores. **Co** cobalt. **C** copper ores. **N** nickel.
- a** indicates the shaft has fallen in.
- b** indicates the mine is filled with water.

- 1b** Bamford mine. **Z**  $1\frac{1}{2}$  miles from Landisville, Lancaster Co.
- 1b** Brookdale mine. **SL**  $2\frac{1}{2}$  miles S. of Phoenixville.
- 2b** Carter's mine. **Ch** Little Britain twp., Lancaster Co.
- a** Charlestown mine. **SL**  $3\frac{1}{2}$  miles S. W. of Phoenixville.
- 1a** Chester Co. mine. **SL** south of Phoenixville.
- 3** Cornwall ore banks. **IC** Lebanon Co.
- 2ab** Ecton mine. **LZ** Shannonville, Montgomery Co.
- 1** Elliott's mine. **Cr** Newlin twp., Chester Co.
- 3** French Creek mines. **IC** Warwick twp., Chester Co.
- 2b** Fritz Island mine. **I** south of Reading.
- 3** Gap mine. **N C Co.** Bart twp., Lancaster Co.
- 2b** Jones' mine. **IC** near Joanna, Berks Co.
- 1b** Keystone mine. **ZL** Birmingham, Blair Co.
- 1a** Line Pit. **Ch** Little Britain twp., Lancaster Co.
- 1b** New Britain mine. **LZ** Bucks Co.
- 1** Pequea mine. **LZ** south of Lancaster.
- ab** Perkiomen mine. **C** Shannonville, Montgomery Co.
- 1b** Phillips' mine. **Ch** W. Nottingham, Chester Co.
- 1b** Phoenix mine. **SLZ** south of Phoenixville.

- 1a** Scott's mine. **Ch** W. Nottingham, Chester Co.  
**2** Susquehanna M. & S. Co's mine. **ZL** Sunbury.  
**3** Ueberroth mine. **Z** Friedensville, Lehigh Co.  
**1b** Wheatfield mine. **I** near Fritztown, Berks Co.  
**1b** Wheatley mine. **SLCZ** south of Phoenixville.  
**1ab** Wood's mine. **ChN** Little Britain twp., Lancaster Co.

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